"Elevation and varieties were among the most important factors in influencing winter injury. A high location proved to be a decided protection for both peaches and apples. * * *

* * * "Other fruits are of relatively minor importance in Indiana and there are only isolated cases from which to draw information. Pears have been injured somewhat more than apples. Sweet cherries were next in tenderness to the peach. Sour cherries suffered no permanent injury, although in one poor location sapwood killing in spots was evident, The plums were not quite so hardy as the apples, except the American varieties, which came through practically uninjured."

"The most severe injury in both the peach and apple originated in the trunk and main branches. This was undoubtedly due to the degree of maturity, as these portions of the tree would be the last to ripen. * * *

"Aside from elevation and variety, the hardiness of the tree was influenced by the growth conditions prevailing during the summer of 1917; that season was short and wet. It is probable that many trees failed to mature their wood properly. Had a normal growing season preceded the severe winter, there might have been no killing in the apple. Thus, even should a like winter come again, unless it were preceded by a similar growing season, the results would not necessarily be duplicated. The chance, therefore, of apples again winter-killing to a similar degree are small."

The balance of the circular is devoted to descriptions of injuries, the best methods of caring for the injured trees, and the insects associated with winter injury.—*J. Warren Smith.*

THE WORK OF THE U. S. WEATHER BUREAU IN THE WEST INDIES.[1]

By OLIVER L. FASSIG, Meteorologist.

[Dated: Weather Bureau, San Juan, P. R., Dec. 1919.]

During the Spanish-American War the presence of a large fleet of our naval vessels in the tropical waters to the south urgently called for special protective measures in the Gulf of Mexico and the Caribbean Sea. In June, 1898, Congress authorized the Weather Bureau to establish and operate weather-reporting stations at selected locations in the islands of the West Indies and along the adjacent coasts of the Caribbean Sea and the Gulf of Mexico.

While the primary object of the new service was the protection of the naval forces of the United States, additional arguments were the greater protection against loss by storm along our own Gulf coast and the coast of the south Atlantic States, as well as the necessity for additional safeguards to the rapidly growing commercial interests in these waters with the opening of the Panama Canal.

Skilled observers of the Weather Bureau were located at 10 well-distributed points within the hurricane area, with instructions to report weather conditions twice daily by cable to Washington from June 1 to November 30, the period during which the severe atmospheric disturbances known as hurricanes may be expected to occur. All reports were cabled to Washington headquarters of the Bureau, where the observations were charted, forecasts were prepared, and warnings issued in case of disturbed conditions arising in any portion of the area.

Soon after our entry into the World War steps were taken by the Chief of the Weather Bureau, Prof. Marvin, to increase the number of storm-warning stations within the hurricane area, and to-day the Weather Bureau has 30 stations on the islands of the West Indies and along the adjacent shores of the Caribbean Sea from which reports are cabled to Washington at 8 a. m. and 8 p. m., Washington time, during the hurricane season, and at which daily records are maintained throughout the year. Within the past year the eastern portion of the area, including the Lesser Antilles and Porto Rico—the gateway to the hurricane belt—has been made a separate forecast district, with San Juan, P. R., as district center.

The system outlined above was inaugurated and maintained primarily as a storm-warning organization, and only incidentally as a climatological service. In the spring of the present year (1919) Prof. Marvin, in view of the growing importance of the commercial and agricultural interests of the area, inaugurated a climatological service, including all of the islands of the West Indies and the adjacent coasts of Central and South America—an area extending from approximately longitude 60 to 90 degrees west, and from latitude 10 to 25 degrees north, or roughly from Barbados, at the extreme east to Panama, and from Curaçao, off the north coast of South America, to Nassau in the Bahama Islands.

Climatological services of large or small extent are maintained in nearly all of the islands of the West Indies under the supervision of their respective local governments, but it is extremely difficult, if not impossible, to get access to the observations made under systems not in accord in methods and measures, or in the absence of regular and systematic publication of results.

Soon after acquiring possession of the Island of Porto Rico as a result of the Spanish-American War in 1898, a climatological service of the Weather Bureau was inaugurated on the Island along lines similar to the climatological sections so familiar to all in the States. This service has been maintained without interruption to the present time, a period of more than 20 years. Records of the weather are made and recorded daily at 60 stations and published monthly.

The first efforts to extend the climatological service to the other islands of the West Indies were initiated during the present year, and arrangements have already been completed to establish 18 stations in our recently acquired Virgin Islands—5 on the Island of St. Thomas, 3 on the Island of St. John, and 10 on the largest and by far the most productive of the islands, St. Croix. Arrangements have also been completed to establish 30 stations in Haiti, with the cordial cooperation of the Haitian Government and officials of the U. S. Navy. From 30 to 40 stations are planned for Santo Domingo.

In the islands referred to above the organizations will be under direct control of the U. S. Weather Bureau. As efficient climatological organizations already exist in Cuba, Jamaica, and the English and French islands of the Lesser Antilles, the plans of the Chief of the Weather Bureau provide for intimate cooperation with the directors of these foreign services with a view to securing a sufficient number of cooperating stations to represent fairly the climatological conditions of their respective islands.

[1] Read at the joint meeting of the American Meteorological Society and the Association of American Geographers, St. Louis, Dec. 31, 1919.

The observations recorded daily will be collected at the end of each month at San Juan, P. R., the headquarters of the new climatological service, and published in a form similar to the climatological section reports being published by the Weather Bureau in each of the States of the Union.

The working out of the details of the organization here outlined will require time, but there is every indication that the cordial cooperation of the foreign Governments concerned will enable the Chief of Bureau to establish, within a year or two, a climatological organization in the tropical area to the south of us which is destined to be of as great value to the agricultural interests of the world as the storm-warning system has proved to be to the shipping and commercial interests in the past 20 years.

Additional plans of the Chief of the Weather Bureau for the tropical organization at San Juan include experiments in upper air conditions in the Tropics to advance our knowledge of the general circulation of the atmosphere and the development of storms within the hurricane belt and to aid in charting aerial routes for the aviator of the future.

AEROLOGICAL WORK IN THE U. S. NAVY.[1]

By Lieut. C. N. KEYSER, U. S. N.

[Author's abstract.]

The Navy has contributed from an early time to the development of meteorology in the United States. The work of Lieut. Maury as early as 1844 is conspicuous as an example of this effort. The development of naval aviation made necessary the training of an Aerological Section, whose value during the war was such as to make its continuation necessary. Its importance as a peace-time activity has been demonstrated in connection with the trans-Atlantic flights and the recruiting trip of the *NC-4* along the coast and up the Mississippi. All of these undertakings were in conjunction with the Weather Bureau, with which the Navy maintains close cooperation. Excellent communication, such as provided by the telegraphic service of the Weather Bureau in conjunction with the radio service of the Navy, has been found of prime importance. The Meteorological Society should prove an excellent medium for cooperation between the Weather Bureau and all other agencies interested in the development of the science of meteorology.

REPORT OF THE CHIEF OF THE WEATHER BUREAU, 1918–19.

The Report of the Chief of the Weather Bureau for the fiscal year ending June 30, 1919, recently published, contains, in addition to the report on the usual and well-known phases of the Bureau's work, certain other interesting material. Occupying a conspicuous place in the report is a discussion of the part the Weather Bureau played in war-time meteorology in such activities as the establishment of aerial wind forecasts, and cooperation with the Army among established established aerological stations; examples of the relation between the work of the Bureau and aeronautics are given in the successful trans-Atlantic flights of the *NC-4* and the British dirigible *R-34*. The "Highways Weather Service," which is a new project, is one of great interest and value, in which the principal Weather Bureau stations keep in touch with the condition of roads and important highways; the service has proved so popular to motorists and others who have frequent use for road information that it has already proved its value. Investigations in volcanology were begun at Kiluea Volcano in Hawaii, with the expectation that they may be extended to volcanoes in Alaska and other portions of the possessions of the United States. Hampered as they were by the war, marine observations are once more being established and extended upon a program which will lead to much more extensive observations over the great ocean areas.—*C. L. M.*

[1] Presented before American Meteorological Society, St. Louis, Mo., Dec. 30, 1919.

REPORT OF THE BRITISH METEOROLOGICAL COMMITTEE.

[Reprinted from *Nature*, London, Jan. 1, 1920, pp. 446–447.]

A report of the Meteorological Committee for the year ended March 31, 1919, has recently been issued. This is the first report since the Armistice, and much interesting information is given in it. Immense strides have been made in meteorology, and the Meteorological Office has expanded accordingly, dependent on the necessities of the war. Whereas the sum available, including many costs for the Services, in the year 1913–14 was 29,380*l.*, in 1918–19 it was 66,371*l.* A much greater demand was made on the office for meteorological instruments, and for forecasts of all descriptions, including the upper air. The marine division, on the other hand, which is dependent for its information on the Royal Navy and mercantile marine, experienced a great falling off in the number of documents received from observers at sea, the documents numbering 2,738 in the year 1913–14 and only 43 in 1918–19. Throughout the war there was great activity in the supply of data to the Army, Navy, and Air Service, and the work commonly undertaken in times of peace was greatly augmented, although most of the information was considered private and was withheld from the general public. The restrictions upon the circulation of meteorological information were removed after the signing of the Armistice. Reports for the several branches of the office show the variety and extended work now undertaken. Any future report will presumably be made through the Air Ministry, to which the Meteorological Office is now responsible.

NEW FORM OF BRITISH DAILY WEATHER REPORT.

Since April 1, 1919, the Daily Weather Report of the Meteorological Office has been issued in three sections. The following is quoted from the official announcement of the change:

I. British Section (B. report). (pp. 4.)
II. International Section (I. report). (pp. 4.)
III. Upper Air Supplement. (p. 2.)

I. The British Section (B. report) is issued daily at noon, in time for circulation by midday post. It contains:

(*a*) Statistics for British stations observing four times a day at 1h., 7h., 13h., and 18h.

(*b*) Statistics for British stations observing twice a day at 7h. and 18h.

(*c*) Particulars of sunshine, etc., reported from health resorts.

(*d*) Weather map for northwest Europe for 7 h. G. M. T. on the scale 1:10,000,000, with inset maps showing the distribution over the British Isles of upper and lower cloud and visibility.

(*e*) A summary of the weather over the British Isles by districts at 7 h.

(*f*) Forecasts for the districts of the British Isles for the 24 hours commencing at 3 p. m., with a "further outlook" if conditions are sufficiently definite.

II. The International Section (I. report) will be issued for the present on the morning of the day following that to which the report refers, in time for circulation with the day's British Section. It contains: